# THE UBIQUITOUS URUSHIOLS
# Contact Dermatitis From Mango, Poison Ivy, and Other "Poison" Plants

## A humorous and interesting review.

Norman Goldstein MD

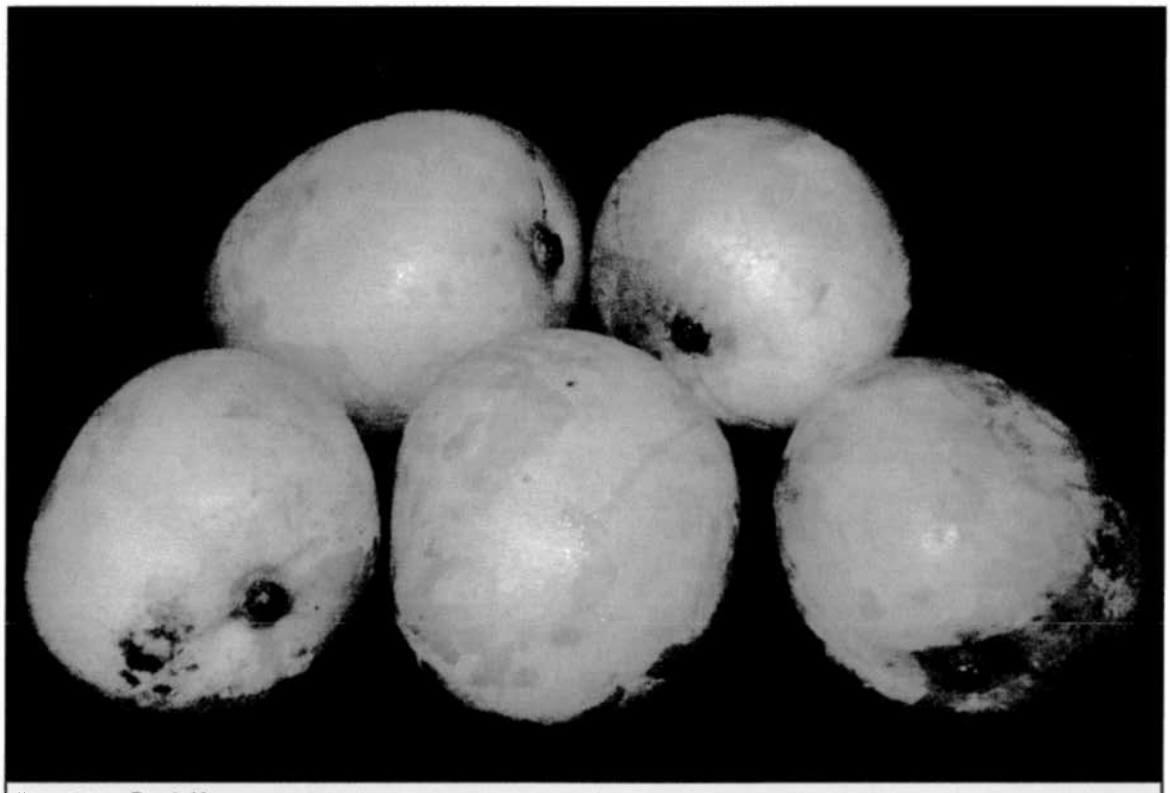

Figure 2.– Fresh Mangoes

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*When Kevin Kitagawa discussed submitting a paper on Mango Dermatitis in the Hawaii Medical Journal, I gave him two Banker's Storage Boxes with references on the subject, including my paper on Ubiquitous Urushiols, published in Cutis 1968.*

*Every season for almost 35 years, I distribute reprints to medical students, patients, referring physicians, and the lay audiences to whom I lecture on Contact Dermatitis.*

*It is reprinted here, courtesy of Quadrant HealthCom Inc., who acquired Farmil Publications Inc., the original owner of Cutis, now in its 73rd volume. The Ubiquitous Urushiols manuscript was awarded First Prize in the Fourth Annual Cutis Manuscript Contest in 1968.*

*The relationship between Ubiquitous Urushiols remains the same today as 35 years ago.* -----

**U-BIQ-UI-TOUS** – existing or being everywhere at the same time.[1]

**U-RU-SHI-OL (oo roo' shi ol)** – from the Japanese; the sap of the lacquer tree.[2]

The Hawaiian islands are blessed with a pleasant climate, peaceful vistas of mountains and the ocean, exotic birds, trees, and flowers, and the absence of poison ivy, oak, and sumac. Mango, however, is abundant and frequently causes dermatitis in people with a history of poison ivy dermatitis. This article will emphasize the cross reactions and the ubiquitous character of mango, poison ivy, and related "Rhus" plants (Fig. 1).

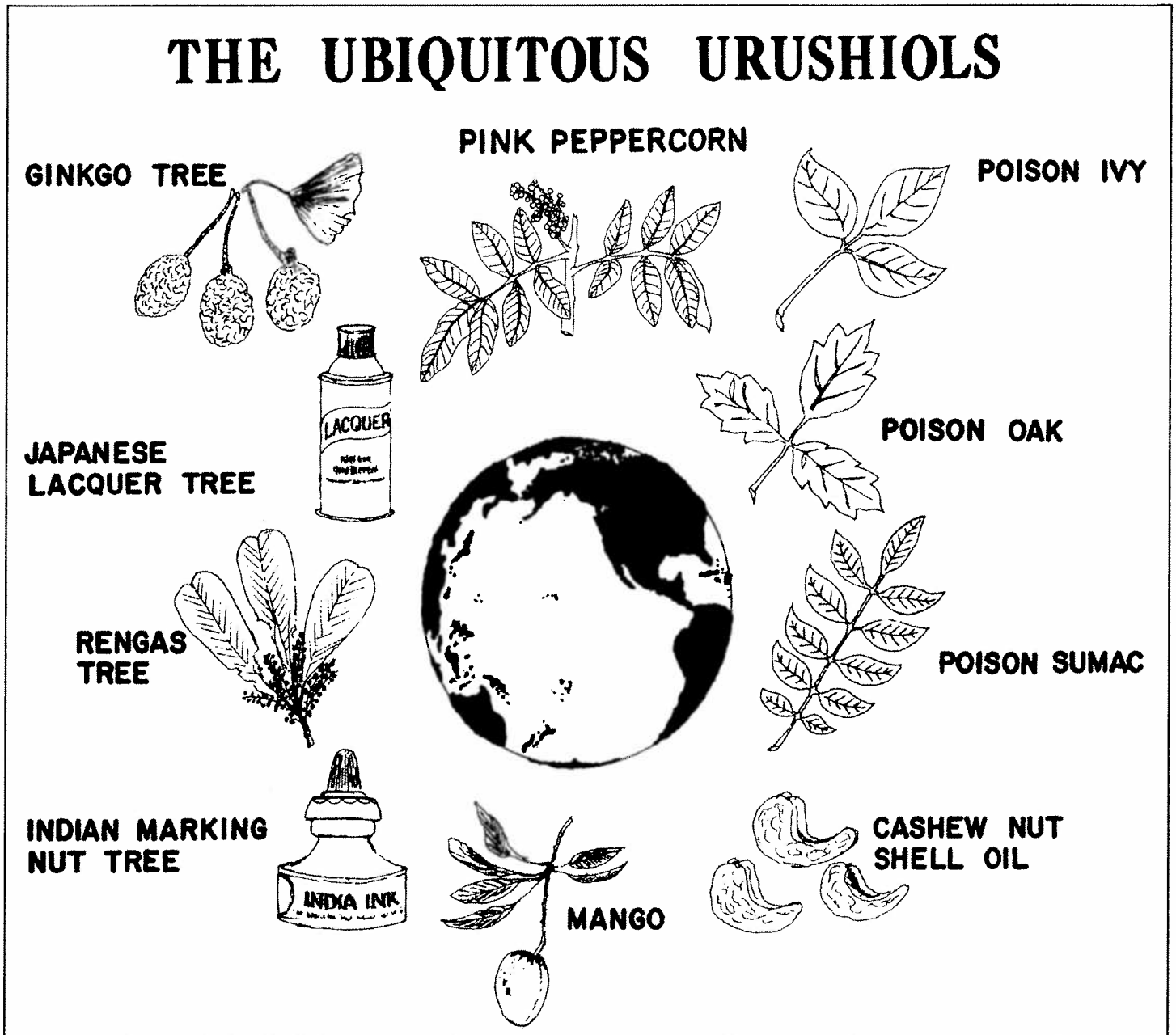



Figure1.— The Ubiquitous Urushiols, illustrating the "around the world" distribution of these related allergens.

Each of the Ubiquitous Urushiols belongs to the *Anacardiaceae* family, and each has a similar antigenic substance in the sap or fruit. This antigen, a pentadecylcatechol, is responsible for more cases of allergic contact dermatitis in the United States than all other allergens combined! The ubiquitous nature of this group of plants may best be appreciated by the following composite case history.

### Case Report of "Mr. Katechol"

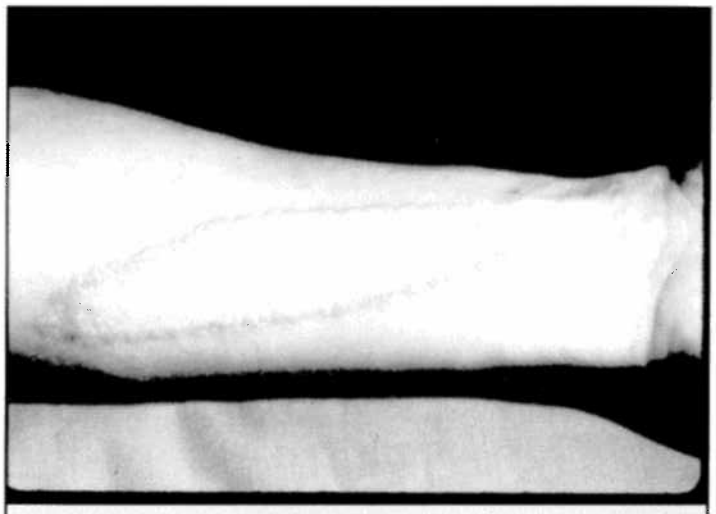
A 35-year-old traveling salesman noted a pruritic vesicular dermatitis on his hands, forearms and around his mouth after *picking and eating mangoes* while vacationing in Hawaii. His past history is replete with recurring episodes of dermatitis. As a youngster, living on a farm in Pennsylvania, a severe bullous eruption of the hands developed *after milking cows*. As a teenager, an eczematous developed on his knees, pretibials, dorsa of the feet, and the extensor surfaces of his forearms after *"playing in the grass."* His playmate also developed a similar pruritic eruption on her buttocks and legs.

Because of his occupation he traveled extensively. Mr. Katechol developed blisters on his hands and feet *while playing golf in Georgia* and *after changing a tire in California*. While in San Francisco, he purchased a Mah-Jongg set, and soon found out that he was "allergic" to the case. Our hapless hero recalled other episodes of dermatitis. Several years ago while "on the road" he developed a sharply outlined *dermatitis encircling his buttocks*. Recently, a small area of "eczema" was noted on the back of his neck *after wearing a new shirt for the second time*. Hoping to get away from his multiple allergies, he came to Hawaii for a vacation. *After sitting at a bar* he noted pruritus of the elbows. Finally, several days later, *he picked up and ate the "king of fruits."*

## Discussion of Case Report

The troubles of our traveler may seem somewhat bizarre and far removed from the simple case of poison ivy dermatitis. The apparently unrelated episodes of eczematous dermatitis are, of course, all caused by members of the "Ubiquitous Urushiols." The first Rhus rash was an indirect one; sap from poison ivy on the Pennsylvania farm was transferred to the udder of a cow, and then to our subject's hands. The second encounter was more direct – actual contact of poison ivy while "playing in the grass." Poison sumac in the woods of a Georgia golf course, and western poison oak on the roadside of a California highway were no diagnostic problems for our traveler. He also realized that there was something on the Mah-Jongg case to which he was allergic – the lacquer finish. A lacquered bar top was responsible for the pruritus of the elbows. He also discovered that he was sensitive to the "king of fruits" in Hawaii. The eruption on the back of his neck was puzzling but most perplexing of all was the encircling rash on the buttocks. A black laundry mark on his shirt collar caused the contact dermatitis on the back of his neck; a lacquer finish of a hotel toilet seat explained his ringed rash.

The common and scientific names, worldwide distribution, and the frequent modes of contact of the ubiquitous urushiols are presented in Figure 1.



Figuer 3.— Mango dermatitis of forearm.

**Mango** – " 'Watch!' he said crisply, 'You're about to taste the king of fruits.' He gripped one, took out his knife, and gashed a complete circle around the long axis. Then he spun the knife, point-over-end, into the tree, and with two hands gripped the halves of the fruit twisting them in opposite directions. The fruit tore apart and for the first time the people in Hawaii tasted 'Whip's luscious discovery'."[3]

Thus Whip Hoxworth introduced the mango to Hawaii in James Michener's novel Hawaii. Fortunately, Whip was not allergic to the "king of fruits"!

The mango is green when unripe and turns yellow, orange or red as it ripens (Fig. 2). Deposits of a shiny, varnish-like substance may be seen on the rind and stem. Since the fruit itself is generally free from urushiol, people sensitive to mango can eat the fruit if it is peeled by someone else.[4] Urticaria and shock have, however, been reported[5-7] after eating mango! This fruit is usually eaten raw, but is also stewed, frozen, and made into chutneys. Leaves of the mango have been used in Mexico to clean teeth and harden gums,[8] but mango stomatitis has not been reported.

The appearance of the dermatitis from mango, as with each of the ubiquitous urushiols, will, of course, vary with the nature of contact. Perioral areas and forearms are most commonly involved (Fig. 3 & 4). Keil [4] states that the absence of linear arrangement of vesicles is rather characteristic of mango dermatitis. While this is usually true, an interesting exception may be noted in Fig. 5. This patient, a dentist, doubting a diagnosis of mango dermatitis of his face, hands, and genitals, scratched his forearm with the stem of a mango to confirm the diagnosis!

Figure 4.— Mango dermatitis on face.

**Cashew Nut Tree** – This tree grows throughout the tropics. Its tiny pink flowers develop a kidney-shaped seed that is edible when roasted. The hulls of the nut contain cardol oil, one of the urushiols. Fortunately, the sensitizing property of cashew nut shell oil is destroyed by heat, so that eating the roasted nut rarely causes difficulty. Resins, mucilages, and printer's ink made from the cashew nut oil, "swizzle sticks" (drink stirrers), and voodoo dolls made from cashew nuts and wood may cause an urushiol dermatitis.[9]

**Japanese Lacquer Tree** – The lacquer finish of furniture and wooden articles may continue to sensitize people for more than 1,000 years according to Toyama.[2] Majima studied the yellow oil from the Japanese lacquer tree in 1906 and named it "urushiol." He derived the name from the Japanese name for the sap, kiurushi. The "do-it-yourself" wood worker may develop a dermatitis from the lacquer in his workshop, while his wife may note a "rash" from a lacquered bracelet or ornamental box.

**Marking Nut Tree of India** – Frequently called the "dhobie itch" (dhobie is Hindu for washerman), laundry marking ink dermatitis was usually limited to the back of the neck. Fasal, however, pointed out[10] that in Malaya the "dhobie

Figure 5.— Mango dermatitis on forearm. Diagnosis confirmed by patient after scratching forearm with mango stem.

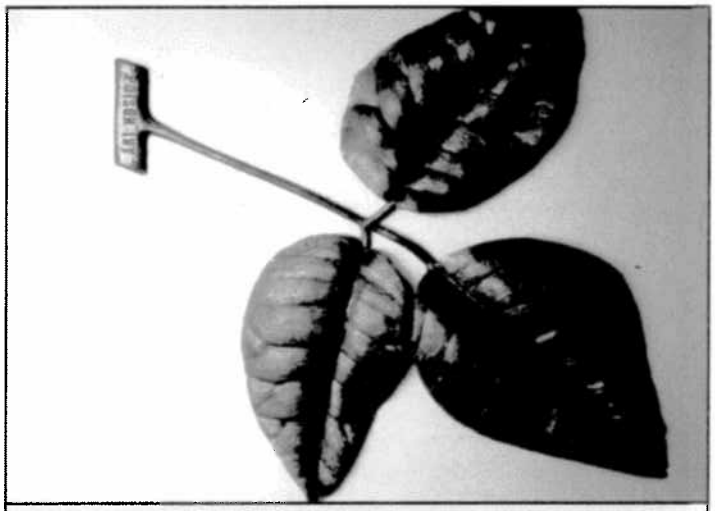


Figure 7.— Leaves of poison ivy (plastic models, Eli Lilly & Co.).


Figure 6.— Ginkgo nuts from Japan.

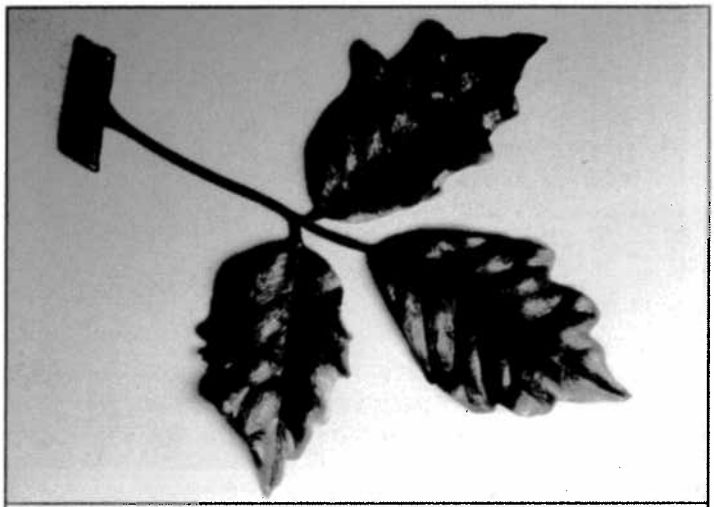


Figure 8.— Leaves of poison oak.

itch" frequently appeared in persons whose laundry was washed at home and thus was not caused solely by laundry marking ink. This may last the life of the clothing because the black oleoresin is not destroyed by boiling.[9]

**Rengas Tree** – Rengas trees, which grow primarily in Malayan jungles, furnish lumber resembling mahogany.[11] Like mahogany, its wood is used for furniture. Unlike mahogany, however, rengas sap cross-reacts with other urushiol plants and trees. If rengas wood furniture is varnished before it is thoroughly dry, the sap may come through the varnish and may plague the owner of the furniture for years. Fasal [10] reported extremely severe and extensive case of contact dermatitis from rengas.

Figure 9.— Leaves of poison sumac.

| Table 1.— The Ubiquitous Urushiols | | | |
|---|---|---|---|
| **Common** | **Scientific Names** | **Distribution** | **Modes of Contact** |
| **Mango**<br>"King of the fruits"<br>"Apple of the tropics" | *Mangifera indica* | Hawaii, California, Florida, India, Central America, Mediterranean | Direct - plant or fruit to skin<br>or<br>Indirect - animal fur, door handles, clothing, particles in air, tools, mosquitoes, golf clubs, fishing tackle, etc. |
| **Poison Ivy**<br>Common poison ivy, poison creeper, markweed | *Rhus radicans* | USA (but not Southwest) Canada, Mexico, Taiwan, Western China | |
| **Oakleaf Poison Ivy**<br>Eastern oakleaf, Poison ivy | *Rhus diversilobum* | Southeastern USA | |
| **Poison sumac**<br>Swamp sumac, poison elder, poison dogwood | *Rhus vernix* | Southeastern USA | |
| **Poison Oak**<br>Western poison oak, yeara | *Rhus toxicodendron* | Pacific Coast USA | |
| **Lacquer Tree**<br>Japanese lacquer tree | *Rhus vernicifera* | Japan, China, India | Wood boxes, bracelets, bar rails, Voodoo dolls, swizzle sticks, resins, mucilages, printer's ink, electrical insulation |
| **Cashew Nut Shell Oil**<br>Cashew oil | *Anacardium occidentale* | India, Africa, Central America, East Indies | |
| **Indian Marking Nut**<br>Dhobie, washerman | *Bella gutti* | India, Malaya | Laundry marking ink |
| **Rengas Tree**<br>Black varnish tree | *Anacardium melanorrhea* | Malaya | Furniture, wood, carvings |
| **Ginkgo Tree**<br>Maidenhair tree | *Ginkgo biloba* | Southeastern USA, China, Japan, Europe | Soaps, cosmetics, Oriental lacquerware, stepping on seeds |

**Ginkgo Tree** – These unusual unisexual trees (separate male trees and female trees!) are unlike any other living tree and would be extinct today if not for the care of Buddhist priests of China and Japan.[12] After pollination, the pairs of ovules develop into yellow seeds. The outer layer of the seed break open when they fall to the ground and cause an offensive smell. The central nut is edible when roasted and is a delicacy in the Orient (Fig. 6). Sowers[13] reported ginkgo dermatitis in 35 students at a Virginia preparatory school. The students all developed a contact dermatitis on their legs after stepping on the fallen seeds.

**Poison Ivy, Oak, and Sumac** – Rhus dermatitis from the related "poison plants" is the most common cause of contact dermatitis. The chemistry of poison ivy and the related urushiols has been extensively studied by Dawson.[2] The characteristics of the plants are well known to Boy Scouts and campers (Fig. 7-9). Fisher[9] points out that "city folk" often acquire poison ivy dermatitis when visiting cemeteries and may even have poison ivy plants growing as ornamental vines on houses! While direct contact with the leaves is the most frequent means of getting "poisoned," indirect contact is not rare. Urticaria and erythema multiforme-like eruptions, as well as fatalities, have been reported from severe sensitivities to these plants.

The interested reader may obtain an illustrated pamphlet on identification, precautions, and eradication of these plants.[14]

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